

Health Risks

- At least, 27 disease agents found in bed bugs: Bacteria, protozoa, viruses & parasitic worms
- Bed bugs do not transmit disease agents

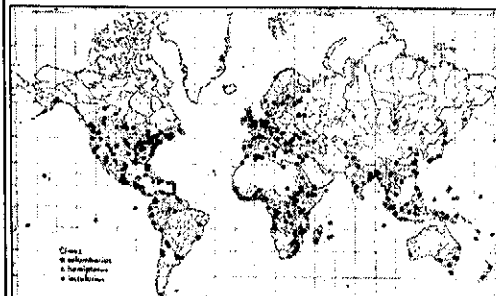
History of Bed Bugs

- Bed bugs have followed humans since the dawn of recorded history,
- And contributed to human misery.

History of Bed Bugs (cont.)

- 8000 - 5000 B.C. Humans began practicing agriculture and domestication of animals
- Humans moved gradually from cave to Villages (Bats are still living in caves)
- 4000 B.C., trend toward congregating in big cities.

Worldwide Distribution of Bed Bugs



History of Bed Bugs (cont.)

- 12,000 BC, Humans lived in Caves with Bats in Middle East



Presence of Bed Bugs

- Spread is not easy to document –
- 400 B.C. in Greece
- 77 A.D. in Italy (A.D. = Anno Domini)
- 600 A.D. in China
- 11th Century, 1st record in Germany
- 13th Century in France

Presence of Bed Bugs (cont.)

- **1583 in England –**
There is also a record that two noble ladies of Mortlake were troubled with *Cimex* sp.
- **20th Century, *Cimex* sp. was more common in Europe, favored by Central Heating.**

Linguistics (cont.)

- Greek – *Coris* (to bite)
- Latin – *Cimex*
- Spanish - Chinche
- French – Punaise (stink)
- English, Celtic – Bug (ghost, goblin)
- Russian – Klop
- Arabic - Buk
- Egyptian – Akalan (itching)
- Thai – Tua Ruad
- Chinese – Piq-seq (wall louse)
- Japanese – Tokozirami (bed louse)

FOLKLORE

- "Snug as a bug in a rug"
- "Crazy as bed bug"
- "Sleep tight and don't let the bed bugs bite!"
- **Poem:**
"The June bug has a gaudy wing,
The lightning bug a flame,
The bed bug has no wings at all,
But it gets there just the same."

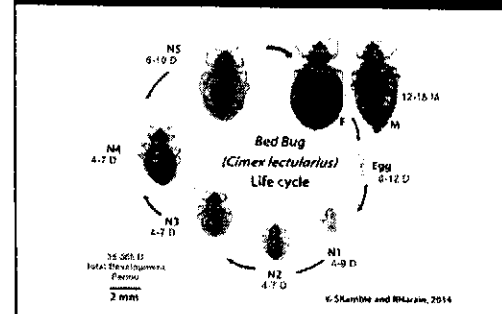
Linguistics

- **Roman Languages, based on *Cimex***
- Germanic langua., Wandlaus (wall louse)
- Slavic langua., Pluskwa (flat louse)
- Czech langua., Stenice (wall)
- Africa-Ethiopian Langua., Tihuan
- Indian langua., Sanskrit - Uddamsa (biter)
- Hindi – Makhun
- Gujrathi – Makan
- Marathi - Dhekoon

Linguistics (cont.)

- "Volkswagen Bug" – Small car free of mysterious defects.
- "Bughouse" or insane asylum
- Got Bugged – Troubled
- Bug Eyed – With protruding eyes
- Big Bug – Important person
- Tennis Bug – A tennis enthusiast
- Bug Juice – Liquor of inferior quality

Life Cycle of Bed Bugs



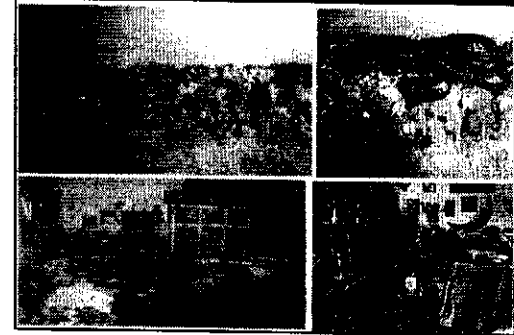
Bed Bug Biology

- Bed bug nymphs must take blood meal to molt successfully.
- Both Male and female bed bugs must take regular blood meal to reproduce.
- Bed bugs are nocturnal and become active between midnight and 5:00 AM

Bed Bug Biology (cont.)

- After blood meal, males are very interested in mating.
- Traumatic Insemination – because male avoid female reproductive organ and literally stabs her right side and releases sperms in body cavity. The sperms migrates to ovaries and fertilized the eggs.
- Females leave aggregation after mating several times to avoid further abuse.

Bed Bug Infestations



Bed Bug Biology (cont.)

- Bed bugs are attracted to body heat and CO2 produced by humans. These cues are detected around 3 ft. distance.
- Bed bugs probe several times before start feeding. They feed for 5-10 min

Bed Bug Biology (cont.)

- A female can produces 1-7 eggs for about 10 days from a single blood meal and she must feed again.
- Female can produce 5-20 eggs from a single blood meal
- Female produces 113 eggs in life
- 80% eggs survive to become adults
- Male and Female ratio is 1:1

Bed Bug Detection



Climb-Up Interceptor

Bed Bug Control: Non-chemical (cont.)**What can be frozen?**

- Most dry household items can be frozen
- Clothes, shoes, jewelry, pictures & toys
- Electronics without an LCD screen

Bed Bug Control: Non-chemical (cont.)**What temperature is required?**

- Freezer with 0°F for 4 days
- 0°F must be reached in the center of the materials; then start counting 4 days
- Bulk items may require more time
- Do not use temp above 0°F (-18°C)

It's winter, & it's cold, can I put
my stuff outside or open windows
NO, NO, NO

**Bed Bug Control with Insecticides**

- **Insecticide Dusts** -- Several dusts are labeled for bed bug control. Dust can be applied to cracks and crevices, puffed behinds baseboards, electrical outlets and other protected areas where bed bugs like to hide
- **Insect Growth Regulators (IGRs)** e.g., hydroprene
- **Consumer products** (do not work well)

Bed Bug Control: Non-chemical (cont.)**What should not be frozen?**

- Electronics with LCD panels
- Historic artifacts or books with value
- Items than cannot be replaced
- Items that contain high moisture or liquids inside

Bed Bug Control with Insecticides**• Aerosol Insecticide Sprays****Non-pyrethroid Insecticides For Use Against Bed Bugs**

| Active Ingredient (insecticide class) | Product Name(s) |
|---|---|
| Imidacloprid + B-cyfluthrin (neonicotinoid + pyrethroid) | Temprid® SC |
| Chlorfenapyr (halogenated pyrazole) | Phantom® SC Phantom® PI |
| Acetamiprid + bifenthrin (neonicotinoid + pyrethroid) | Transport® Mikron Transport® GHP |
| Thiamethoxam + A-cyhalothrin (neonicotinoid + pyrethroid) | Tandem® |
| Dinotefuran + diatomaceous earth (neonicotinoid + silica dioxide) | Alpine® Dust Alpine® PI |
| Neem seed oil (azadirachtin) | Cirkul® CX Cirkul® RTU |

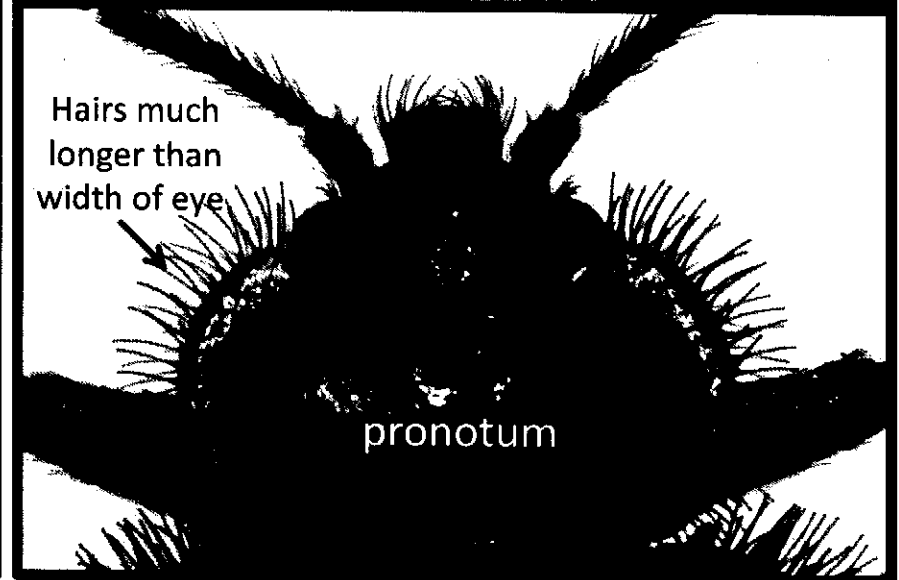
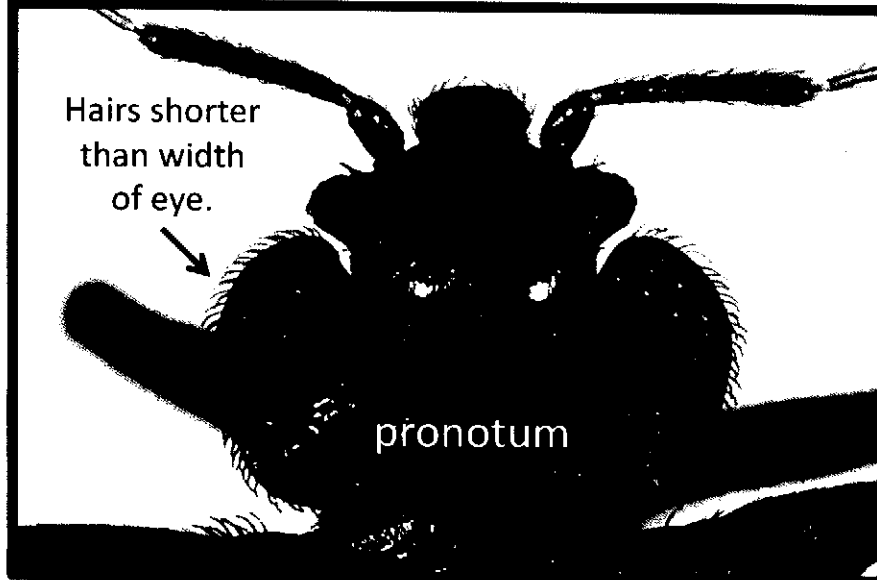
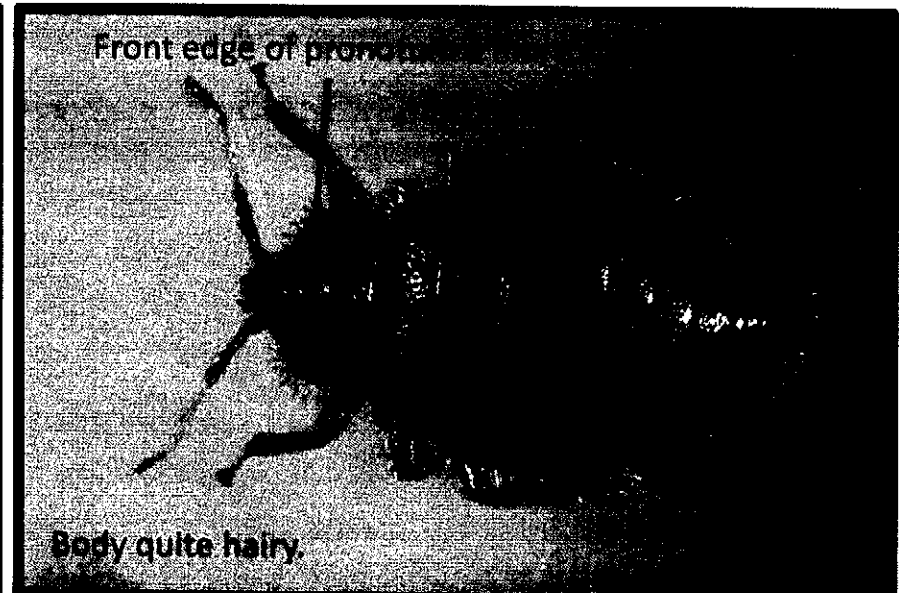
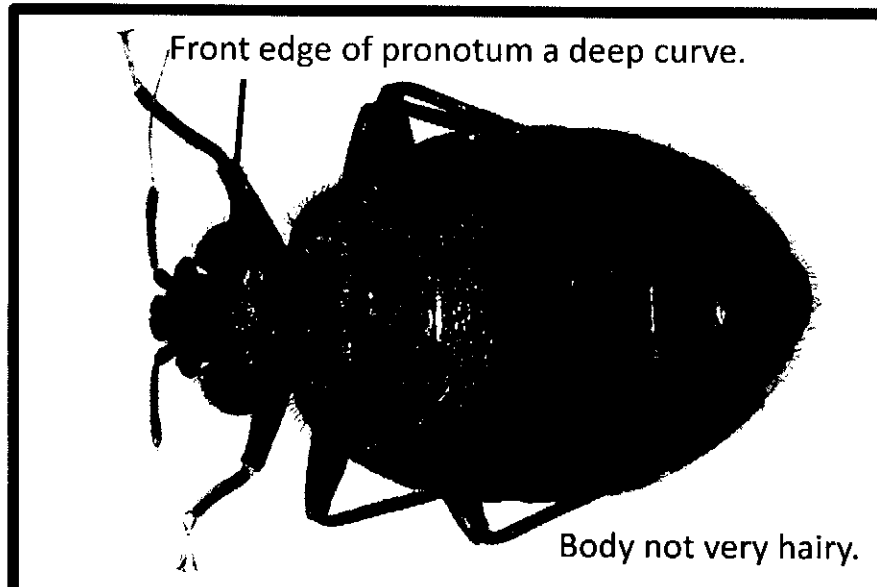
Summary

- **Integrated Pest Management approach is necessary.**
- **Bed bugs do not transmit diseases**
- **Bed bug are resistant to pyrethroid insecticides**
- **Follow rotation of insecticides with non-pyrethroids**
- **Seek Professional Pest Control Service**

Questions?



Comparison between the Bed Bug and Eastern Bat Bug



Bed Bug, *Cimex lectularius*

Eastern Bat Bug, *Cimex adjunctus*

